

SCIENTIFIC RESULTS OF EXPLORATIONS BY THE U. S.
FISH COMMISSION STEAMER ALBATROSS.

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No. XXXI.—DESCRIPTIONS OF NEW GENERA AND SPECIES OF CRABS OF
THE FAMILY LITHODIDÆ, WITH NOTES ON THE YOUNG OF LITHODES
CAMTSCHATICUS AND LITHODES BREVIPES.

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CRUSTACEA of the convenient suborder of Decapoda known as Anomura, from the North Pacific Ocean and Bering Sea, a region prolific in representatives of this group, have been gradually accumulating in the Museum. Recently large collections have been received from the U. S. Fish Commission from dredgings made by the steamer *Albatross* in Bering Sea and on the voyage to and from that locality. In these collections are many fine specimens of the family *Lithodidae*, which contains the largest of known crabs, with the exception of the giant maioid crab of Japan, *Macrocheira kaempferi* of de Haan. Though the following descriptions and notes are based principally on Fish Commission material from the above region, one species of *Lithodes* is described from the North Atlantic and one from the South Pacific.

LITHODES GOODEI, new species.

Lithodes agassizii, SMITH (part), Bull. Mus. Comp. Zool., x, p. 8 (part), pl. I, figs. 2 and 2a, 1882; Proc. U. S. Nat. Mus., vi, 1883, p. 25 (part); Rept. Comr. of Fish and Fisheries, 1882, p. 351 (1884); Rept. Comr. of Fish and Fisheries, 1885, p. 607 [3], p. 638 [34], pl. III, figs. 1 and 2 (1886).—VERRILL, Rept. Comr. of Fish and Fisheries, 1883, pp. 521, 553 (part), pl. XXXIII, figs. 151a 151b (1887).

An examination of the specimens of *Lithodes* taken by the *Albatross* in deep water off the eastern coast of the United States, shows a wide difference between those from south of Cape Hatteras and those from more northern waters. The average range in depth of the northern form is about 900 fathoms, of the southern 500 fathoms. The southern form, *Lithodes agassizii*, was described by Prof. S. I. Smith from the dredgings of the *Blake*.^{*} Prof. Smith also describes and figures in the same place the young of the northern form as the young of *L. agassizii*.

^{*} Bulletin of the Museum of Comparative Zoology, x, p. 8.

A series of specimens from both localities convinces me that the two forms constitute good species.

These two species and the species described next in order constitute a group having in common a rostrum with a long median spine and two basal spines and lacking the subrostral spine or horn usual in the genus.

The carapace of *L. goodei* is much more convex than that of *L. agassizii*. The spines arise from the summit of large tubercles, and the surface altogether lacks the small spines so thickly sprinkled over the latter species. The spines of the rostrum like those of the carapace are much longer than those of *L. agassizii*, and while the horn is wanting, its position is indicated by a slight protuberance. The antennal scale is rudimentary, with the exception of a specimen from station 2203 on which it is rudimentary on the left side and well developed on the right.

On the second segment of the female abdomen there are about twelve spines ranging in length from 12 to 20 mm. The large plates on the left side of the abdomen are but little calcified in *L. agassizii*; in *L. goodei*, they are much more firm. The conical tubercles are also better calcified and fewer in number on the leathery portion.

Another marked difference between the two species lies in the very much longer spines of the chelipeds and ambulatory legs. In the adult specimen before me from station 2193, several spines on the carpal and propodal joints reach the great length of 43 mm.; on another specimen they are but 30 mm. In our largest specimen of *L. agassizii* the spines on these segments measure but five or six mm. A no less striking difference is seen in comparing the ambulatory legs of the two species, the subcylindrical legs of *L. goodei* contrasting with the flattened legs of *L. agassizii*, the former free from spinules between the spines and the latter thickly sprinkled with them.

Young: In *L. goodei* the variation in length of spines from the young to the adult is extreme. In a young specimen 70 mm. in length the length of one of the spines at the base of the rostrum is 44 mm.; the spines of the carapace are from 32 to 38 mm. in length.

Type.—No. 8047, U.S.N.M.; female; off Nantucket Shoals; station 2196; 1,230 fathoms.

LITHODES DIOMEDELE, new species.

This species is very close to *L. goodei*, but it is not difficult to separate the two. Good specimens were obtained by the *Albatross* from station 2789, off the southern part of Chile, in latitude $42^{\circ} 36' S.$, No. 18526, U.S.N.M. Numerous young *Lithodes* taken at station 2788, in latitude $45^{\circ} 35' S.$, No. 18527, U.S.N.M., I have also referred to this species.

The spines of the carapace are not so long as those of *L. goodei*, but are more slender and similarly placed; their tubercular bases are not

so large and swollen as in the Atlantic species. The rostrum is of the same character as in *L. goodei*. The chelipeds are much the same, but the fingers are a little more slender and the tubercles on the prehensile edges of the right hand are much smaller. The ambulatory feet have a few spines twelve mm. in length on the carpal and propodal segments. One of the largest spines of the ambulatory feet projects from the ischium, while the spines of the coxal joints alone are sufficient to distinguish this species from any other species of *Lithodes* that I have seen. These spines project from the distal lower margin and vary from eight to eleven mm. in length.

The numerous young taken at station 2788 are similar to the adult, except that where spines are barely indicated in the adult there are short sharp spines in the young.

LITHODES ÆQUISPINUS, new species.

Carapace, rostrum, chelipeds, and ambulatory legs with conical spines subequal in length. The range in length is from about four to six mm. The longest spines of the carapace are scattered along the lateral margins; the longest spines of the cheliped are at the inner distal margin of the merus and the spines on the middle point of the inner margin of the carpal segment. The areolations of the carapace are well marked, but not so bold as in some species. The rostrum is on a line continuous with the gastric region, and consequently a little depressed. A line of seven spines runs along the median line of the gastric region to near the bifurcate tip of the rostrum. The two spines on the rostrum are larger than those of the gastric region. The rostrum is armed with nine spines, arranged as follows: Two on each side, two above, two at the end forming the bifurcate tip, and the lower spine or horn, which is the largest spine on the species.

Locality.—Bering Sea, stations 3332, 3489, and 3502; 184 to 406 fathoms.

Type.—No. 18528, U.S.N.M.; station 3332; 406 fathoms.

LITHODES COUESI, new species.

This species reminds one of *L. maia*. The largest spines of the carapace are arranged about the margin; they are slender and sharp. The longest are situated at the outer orbital angles, the antennal angles, the hepatic regions, and three on the margin of the branchial regions. The spines on the intervening spaces of the margin are more numerous and much smaller. The surface of the carapace is set with short, sharp, conical spines. The gastric region is swollen and well defined. The cardiac region is barely indicated between the confluent branchial regions. The depression between the gastric and cardiac regions is very deep. The rostrum is 20 mm. long, and made up as in *L. maia*, but the terminal portion beyond the distal lateral branches is slender and bifid rather than bifurcate, as in *L. maia*; the basal branches are

a little further forward. The scale is rudimentary; the spine at the outer angle is branched at the base, the branch consisting of a single short, sharp spine on the outer surface. The abdomen is without spines; the spines of *L. maia* are replaced by tubercles; those of the first segment are very much closer together than the corresponding spines in *L. maia*. The tubercles on the lower margin of the second segment are low and somewhat oblong at base; those in the center of the segment are larger.

The chelipeds are slender and weak. The armature of the fingers of the right hand is slight; the fingers gape. The fingers of the left hand are long and slender and gape at base. The spines of the chelipeds and ambulatory legs are numerous and arranged about as in *L. maia*, but are shorter.

Locality and type.—At station 3329, in 399 fathoms, north of Unalaska, a single male (No. 18531, U.S.N.M.) was taken; also at station 3338, off Shumagin Bank, in 625 fathoms, three young specimens (No. 18532, U.S.N.M.) which I refer to this species without hesitation. The rostrum differs in being bifurcate as in *L. maia*. It is possible that additional specimens of the adult form might show the rostrum to be bifurcate rather than bifid.

LITHODES RATHBUNI, new species.

Carapace of male armed with long spines on the different regions; also with longer spines on the margins. There are four on the gastric; two short and two long on the cardiac region. The branchial region has six spines of various lengths. The postero-lateral margin has the longest spine, it being 26 mm. in length on one side and 23 mm. on the other. Both have lost their points. Anterior to this there are three spines, the shortest unbroken one being 17 mm. long; on the margin posterior to the longest spine there are four spines, the longest of which is 14 mm. in length and the shortest eight mm. The rostrum is composed of five branches; the main stem is sharply bent upward and is strongly bifurcate; the lower horn is almost on the horizontal line of the body, and projects forward more like the usual main portion of the rostrum; the lateral branches arise at the base and project forward. The movable spine of the antenna is very long and slender; there is a short branch or spine on its outer and upper margin near the base.

The right cheliped is slender and rather weak. Its longest spine is situated on the distal upper margin of the merus. There are upwards of twelve spines on the carpus. On the median outer surface of the palm there are two rows of four spines each. The fingers gape at the base; their prehensile edges are tubercular. The left cheliped is smaller and more slender than the right. The cutting edges of the fingers run back to the gape, or a little more than one-half their length. The ambulatory legs are slender and very spiny; the spines are from three to five mm. in length.

Locality.—Station 3191, off San Simeon Bay, California, in 211 fathoms.

Type.—No. 18533, U.S.N.M.

LITHODES CALIFORNIENSIS, new species.

This species is remarkably like the preceding, except in the relative length of its spines and the form of the rostrum. It comes from about 100 miles farther south. There are two specimens, both females, while the only representative of the preceding species is a male. As the differences between them are not known to be sexual, I hesitate to unite them.

The spines of the carapace are much shorter and stouter, but occupy the same relative position. On the lateral margin there are two long spines; the one above the third ambulatory foot equals in length, but is much stouter, than the one similarly placed on the preceding species. The most marked difference between the two species is in the rostrum; in both specimens of *L. californiensis* the rostrum is bifid, while in *L. rathbuni* it is bifurcate, the tip being composed of two well-developed divergent horns. The subrostral spine extends out almost as far as the rostrum proper. The chelipeds are as in *L. rathbuni*, except that the spines are shorter and there is less gape in the right hand and more in the left.

Locality.—Station 2949, off Santa Cruz Island, California, in 155 fathoms.

Type.—No. 18534, U.S.N.M.

LITHODES CAMTSCHATICUS (Tilesius).

Maja camtschatica, TILESIIUS, Mem. Acad. Imp. Sci., St. Petersburg, v, 1812, p. 336, pls. v and vi (1815).

Lithodes camtschaticus, LATREILLE in Cuvier's Règne Animal, 2d ed., iv, p. 65.

Lithodes spinosissimus, BRANDT, Bull. Phys. Math. Acad., St. Petersburg, vii, 1849, p. 172 (Young).—STIMPSON, Boston Jour. Nat. Hist., vi, p. 478, 1857.

The measurements and description of *L. spinosissimus* given by Brandt indicate that the thorax sent him by Wosnessenski was that of a young specimen of *Lithodes*. The Alaskan collections contain many young *Lithodes* that come well under Brandt's short description, except that the rostrum proper is bifid, while Brandt describes it as simple. One specimen from a lot taken at station 3233, $7\frac{1}{4}$ fathoms, Bristol Bay, answers his description in this respect. I believe this specimen to be abnormal, as the other young from the same station have the bifid rostrum. The spines on the carapace of the young are placed as in the adult, but are proportionally much longer. A large amount of dredging has been done in Alaskan waters, and nothing that I have seen approaches the description of *L. spinosissimus* except the young *Lithodes* which I have confidently referred to *L. camtschaticus*.

LITHODES BREVIPES, Milne-Edwards and Lucas.

Lithodes brevipēs, MILNE-EDWARDS and LUCAS, Arch. Mus. Hist. Nat., Paris, II, p. 465, pls. XXIV-XXVII, 1841.

Lithodes camtschaticus, RICHTERS, Abh. Senek. Natur. Ges., XIII, p. 404, figs. 9 and 10.

In the work cited Dr. Richters describes and figures young *Lithodes* as the young of *L. camtschaticus*. There are four specimens of the same form in the collection; one obtained by Mr. William Palmer at St. Paul Island, where Dr. Richters' specimens were collected; two by Dr. L. Stejneger at Bering Island, and one dredged by the *Albatross* at station 3558 in 25 fathoms. The largest specimen is a cast shell washed up by the tide; it is 34 mm. in length and 31 mm. in width. The smallest specimen is 16 mm. in length by 14 mm. in width. In most respects the largest of the young is a miniature of the adult *L. brevipēs*, but contrary to the rule in seven species of *Lithodes* the young of which are in the collection, the young of *L. brevipēs*, if I have not mistaken it, have but a bare indication of spines, or rather of the place where spines are to be, the spines being indicated on the carapace of the smallest by small granules better seen with a lens, while in the largest specimen the spines are indicated by tubercles, and at the summit of the tubercles there is not the slightest indication of the sharp, horny-tipped spine of the adult *L. brevipēs*. The movable antennal spine of the adult is bifurcate; in the young it is bifid.

LEPTOLITHODES, new genus.

Paralomis (part), HENDERSON, Challenger Report, XXVII, p. 44, 1888. Not *Paralomis*, WHITE and STIMPSON.

White established the genus *Paralomis* in 1856 by thus designating *Lithodes granulatus* of Hombron and Jacquinot. An examination of a single specimen of that species from Sandy Point, Straits of Magellan, shows it to belong to White's previously established genus *Echinocerus*. The name *Paralomis* as a synonym of *Echinocerus* being no longer available, I propose the name *Leptolithodes* for those species having long and angular ambulatory legs and comparatively stout chelipeds. The species of the genus will then be as follows, in the order of description: *Leptolithodes aculeatus* (Henderson), *L. asper* (Faxon), *L. longipes* (Faxon), and the two species here described from the west coast of the United States and British Columbia.

LEPTOLITHODES MULTISPINUS, new species.

The carapace is about as broad as long; the areolations are well defined. On the median line at the summit of the gastric region there is a sharp spine about four mm. in length. The lateral margins are armed with from twelve to sixteen spines about three mm. in length. In the young and in some of the adults there are small spines on the branchial region. A semicircular line of six or seven spines marks the

limits of the branchial and intestinal regions. The carapace is thickly studded with blunt spines, each terminating in a flattened face or surface cut obliquely to the surface of the carapace; this face is encircled by a fringe of short stiff bristles. The rostrum consists of a simple median spine with two basal spines. Under the rostrum proper there is a very short conical spine homologous with the subrostral spine of *Lithodes*; behind the spine are one or more spinules. The abdomen in the male is composed, after the second segment, of several rows of leathery plates; the second segment is better calcified and harder. The abdomen of the female is twisted to the right as in *Lithodes*.

The chelipeds are moderately slender and extend almost to the distal end of the carpal joints. The spines on the inner margin of the carpal segments are the most prominent. The ambulatory legs are long and slender and thickly set with spines. The spines of the merus are not so distinctly arranged in rows as on the carpal and propodal segments; there is, however, a distinct row on the upper margin. The spines of the carpus are arranged in eight more or less distinct rows; on the propodal segment the spines are arranged in six full rows and two half rows. There are four short rows of spines on the proximal end of the dactylus. The dactyli are compressed, slightly bent and a little twisted. An average-sized specimen measures 80 mm. in length, 78 mm. in breadth, and the distance from tip to tip of the ambulatory legs is 360 mm.

Types.—No. 18535, U.S.N.M., off Queen Charlotte Islands, British Columbia, station 2860, 876 fathoms.

LEPTOLITHODES PAPILLATUS, new species.

From the *Albatross* dredgings off Lower California, or perhaps south of that region, there is a male specimen of *Leptolithodes* without a label. It is much larger than any other species in the collection, and while differing materially is yet very closely related.

The carapace is broader than long; the areolations are well marked. The gastric region has no spine, and is not protuberant as in *L. multispinus*. The cardiac region is much shorter; the depressions run into one which extends to the margin of the carapace at the middle of the posterior border. In *L. multispinus* the grooves run separately back to the posterior border, with the posterior point of the cardiac region between them. There are no spines on the dorsal surface or margin of the carapace; even the anterior angles lack spines. From the spines at the external orbital openings to the posterior margin there are small tubercles or papillæ on the margin. In the center of some of these tubercles by the aid of a lens a very small horny point can be seen surrounded by bristles. The surface of the carapace is thickly set with these small papillæ which bear stiff setæ irregularly scattered over the summit. In *L. asper* (Faxon),* the papillæ are encircled with a crown of stiff setæ.

* Bull. Mus. Comp. Zool., xxiv, p. 161, 1893.

The rostrum is simple with two very small basal spines. Beneath the rostral spine there is a swelling where in *L. multispinus* there is a short spine. The eyes extend far beyond the basal spines of the rostrum, while in *L. multispinus* the spines extend much beyond the eyes.

The chelipeds are much stouter than those of *L. multispinus*, and the fingers of both hands are more curved.

The ambulatory legs are similar to those of *L. multispinus*, but the spines are not so long and are broad at the base; the dactyli are comparatively shorter, stouter, and broader at the tips.

Type.—No. 18536, U.S.N.M., off Lower California (?).

PRISTOPUS, new genus.

The rostrum, antennal scale, and the character of the abdomen are substantially as in *Leptolithodes*. The legs are much compressed; the anterior and posterior margins are set with sharp spines. In *Leptolithodes* the legs are angular, not at all compressed, and the spines are arranged in rows on the angles or ridges. *Paralomis formosus*, Henderson, belongs to this genus.

PRISTOPUS VERRILLI, new species.

The carapace is verrucose, the areolations prominent. The gastric region is much elevated and is surmounted by a small spine. On each side, on the border of the branchial region, there is a deep pit. A groove runs from the pits to the depression between the gastric and cardiac regions. There are about twelve spines, two to three mm. in length on the lateral border of the carapace. The posterior boundary of the intestinal region is marked by a semicircular row of tubercles. The cardiac region is triangular; the apex of the triangle cuts well into the intestinal region where the depression that marks it runs into a deep slit or oblong median depression. The frontal margin is broad and straight. The spines of the anterior angles and the orbital spines point forward; the orbital spines are a little the longer. Between the spine on the angle and the orbit there is a row of smaller spines and one or two granules. The trispinose rostrum is composed of a bifurcate rostrum proper and the subrostral spine which extends much beyond the two upper rostral spines. The antennal scale tapers to a sharp point and has three sharp spines or branches on each side. The lateral plates on the left of the abdomen in the female are fringed with short, slender, blunt spines.

The chelipeds extend a little beyond the middle of the propodal segment of the first pair of ambulatory feet. The right cheliped is stouter than the left. The prehensile edges of its fingers are strongly tubercular. The upper margin of the palm is spiny; there are also some small spines on the middle and on the lower margin. There are three long spines on the inner margin of the carpus. The left cheliped is similar but smaller, and the prehensile edges of the fingers are sharp.

The ambulatory feet are wide and much compressed. The anterior and posterior margins are armed with sharp spines, alternating in general large and small. On the upper surface of the proximal end of the merus of the fourth pair of feet there is a row of fine spines; the corresponding spines on the third pair of feet are smaller, and on the second pair still smaller.

Type.—No. 18537, U.S.N.M. Off the Pribylof Islands, Bering Sea, station 3501, 688 fathoms.

GEDIGNATHUS, new genus.

Similar to *Dermaturus*, but with the terminal joints of the outer maxillipeds much dilated as in *Hapalogaster*. The outer margin of the antennal scale is expanded and thin; the inner margin is concave, giving the scale a half-moon shape.

GEDIGNATHUS GILLI, new species.

Carapace longer than wide, convex in both directions. The areolations are not well marked but can be made out. There are no spines on the margin behind the antero-lateral angles. The surface is set with flattened plates moderately large, and of a deeper color than the surface; these plates are surrounded by rows of short curled bristles; on the anterior side of the plates are patches of holes larger than those from which the hair arises; they may be the follicle holes caused by some larger form of bristle that has disappeared from the old dry specimens from which this description is written. The lower surface of the broad moon-shaped antennal scale is smooth, the upper surface is rough, the outer edge has three or four short triangular teeth. The spine at the external angle of the orbit is very small; the rostrum is simple, short, and pointed. The distal ends of all the joints of the maxillipeds are swollen, but in the ultimate and penultimate remarkably so. The abdomen is as in *Dermaturus mandti*. The chelipeds are thickly set with granular tubercles. The right one is very large and reaches much beyond the ambulatory feet. The fingers gape widely from the palm to the tips. The left cheliped is much smaller, and the hand in proportion to the large one reminds one of *Gelasimus* among the Brachyura. The fingers are spoon-shaped; they have some very small tubercles on the edge, but the edge for the most part is black horn color. The ambulatory feet are rounded, short, and strong, without spines; the dactyli are compressed and armed with spinules beneath.

Types.—No. 18525, U.S.N.M.; locality unknown, 2 ♂.

Locality.—Alaska, W. H. Dall; one claw, without label, No. 18524, U.S.N.M.

LEPEOPUS, new genus.

Rostrum simple, triangular. Penultimate and ultimate joints of maxillipeds not dilated. Antennal scale short, flattened. Abdomen of female much twisted to the right; first segment very small, second very

large; third, fourth, and fifth segments represented on the left margin by large plates; sixth and seventh segments very small. In the male, the third, fourth, and fifth segments are soft, without plates; the sixth segment is central, and the seventh difficult to distinguish. The chelipeds are subequal, the fingers long and spoon-shaped. The dactyli of the three pairs of ambulatory feet shut against two spines situated on the distal under surface of the propodus, giving the feet a prehensile character.

LEPEOPUS FORCIPATUS, new species.

The carapace is flattened, broader than long; the areolations are but slightly marked. The anterior angles of the carapace are produced to a point reaching much beyond the line of the points of the prominent orbital spines or points. The rostrum is triangular, produced and bent downward. The antennal scale is short, flattened, and squamose. The carapace and abdomen are thickly set with rows of short bristles situated in transverse, straight depressions. The ambulatory legs are also set with rows of short bristles, but the depressions are semicircular and imbricated. These, with the markings of the carapace, give the crab a very squamose appearance. The squamæ of the chelipeds are much smaller and less conspicuous. The chelipeds are not so long as the ambulatory feet, reaching to about the middle of the propodal joints. There are four or five spines on the inner and upper margins of the merus, and one on the inner margin of the carpus. The fingers are long and weak, broadening out into spoon-shaped tips. The outer or contact edges are armed with very small tubercles and bunches of bristles, while the inner edges are armed only with the bristles. The merus of the ambulatory legs is armed on the anterior margin with five or six short conical spines; it is broad and much flattened; its anterior margin is semicircular and its posterior margin straight. The carpus is much narrower than the middle of the merus and is about the same width as the propodus. The propodus has straight margins and is much flattened; on its distal under surface are two spines which receive the dactylus; right behind on the central line is a third sharp spine. The dactyli are short and flattened, terminating in a sharp, spine-like tip; the inner margin is thin and armed with spinules.

I know nothing of the habits of this crab, but from its lightness and soft texture, the shell being calcified merely enough to keep its form, I believe it may be found among seaweed, when its subprehensile ambulatory legs may assist it to hold its position.

Types.—No. 6608, U.S.N.M.; Parry Passage, Graham Island, British Columbia, J. G. Swan; 2 ♂, 1 ♀.